What is claimed is:

1. An antimicrobial peptide represented by Formula I:

Formula I

wherein:

X is any natural or non-natural, modified or unmodified amino acid except glutamate or aspartate;

n = 1 to 5;

wherein:

(a) when n=1, then

said peptide comprises a cationic amino acid;

the charge of said peptide at neutral pH is +1;

R_1 is C_1-C_{20} alkyl; C_3-C_6 cycloalkyl; C_4-C_{20} alkenyl; C_4-C_{20} alkynyl; C_1-C_{20} haloalkyl; C_3-C_{20} haloalkenyl; C_3-C_{20} haloalkynyl; C_2-C_{20} alkoxyalkyl; C_2-C_{20} alkylthioalkyl; C_2-C_{20} alkylsulfinylalkyl; C_2-C_{20} alkylsulfonylalkyl; C_5-C_{20} cycloalkylalkyl; C_4-C_{20} alkenyloxyalkyl; C_4-C_{20} alkynyloxyalkyl; C_4-C_{20} (cycloalkyl) oxyalkyl; C_4-C_{20} alkenylthioalkyl; C_4-C_{20} alkynylthioalkyl; C_6-C_{20} (cycloalkyl) thioalkyl; C_2-C_{20} haloalkoxyalkyl; C_4-C_{20} haloalkenyloxyalkyl; C_4-C_{20} haloalkynyloxyalkyl; C_4-C_{20} alkoxylalkenyl; C_4-C_{20} alkoxyalkynyl; C_4-C_{20} alkylthioalkenyl; C_4-C_{20} alkylthioalkynyl; C_4-C_{20} trialkylsilylalkyl; C_1-C_{20} alkyl substituted with NR_3R_4, nitro, cyano, or phenyl optionally substituted with R_5, R_6, and R_7; C_1-C_{20} alkoxy; C_1-C_{20} haloalkoxy; C_1-C_{20} alkylthio; C_1-C_{20} haloalkylthio; NR_3R_4; or phenyl, benzyl, pyridyl, furanyl, thienyl, naphthyl, pyrimidinyl, benzofuranyl, benzothienyl, or quinolinyl each optionally substituted with R_5, R_6 or R_7;

R_3 is independently hydrogen; C_1-C_4 alkyl; or phenyl optionally substituted

with at least one R_8;

R_4 is independently hydrogen; C_1-C_8 alkyl; or phenyl optionally substituted with at least one R_8;

R_5 is independently C_1-C_6 alkyl; C_1-C_6 alkoxy; C_1-C_6 haloalkyl; halogen; C_2-C_8 alkynyl; C_1-C_6 thioalkyl; phenyl or phenoxy each optionally substituted with at least one R_8; cyano; nitro; C_1-C_6 haloalkoxy; C_1-C_6 haloalkythio; C_2-C_6 alkenyl; C_2-C_6 haloalkenyl; acetyl; CO_2CH_3; or $N(C_1$-C_2 alkyl$)_2$;

R_6 is independently methyl; ethyl; methoxy; methylthio; halogen; or trifluoromethyl;

R_7 is independently halogen; and

R_8 is independently halogen; C_1-C_4 alkyl; C_1-C_4 alkoxy; C_1-C_4 haloalkyl; nitro; or cyano;

(b) when n = 2 or 3, then

at least one of the amino acids is a cationic amino acid;

the net charge of said peptide at neutral pH is at least +1;

R_1 is C_1-C_9 alkyl; C_3-C_6 cycloalkyl; C_4-C_9 alkenyl; C_4-C_9 alkynyl; C_1-C_9 haloalkyl; C_3-C_9 haloalkenyl; C_3-C_9 haloalkynyl; C_2-C_9 alkoxyalkyl; C_2-C_9 alkylthioalkyl; C_2-C_9 alkylsulfinylalkyl; C_2-C_9 alkylsulfonylalkyl; C_5-C_9 cycloalkylalkyl; C_4-C_9 alkenyloxyalkyl; C_4-C_9 alkynyloxyalkyl; C_4-C_9 (cycloalkyl) oxyalkyl; C_4-C_9 alkenylthioalkyl; C_4-C_9 alkynylthioalkyl; C_6-C_9 (cycloalkyl) thioalkyl; C_2-C_9 haloalkoxyalkyl; C_4-C_9 haloalkenyloxyalkyl; C_4-C_9 haloalkynyloxyalkyl; C_4-C_9 alkoxylalkenyl; C_4-C_9 alkoxyalkynyl; C_4-C_9 alkylthioalkenyl; C_4-C_9 alkylthioalkynyl; C_4-C_9 trialkylsilylalkyl; C_1-C_9 alkyl substituted with NR_3R_4, nitro, cyano, or phenyl optionally substituted with R_5, R_6, and R_7; C_1-C_9 alkoxy; C_1-C_9 haloalkoxy; C_1-C_9 alkylthio; C_1-C_9 haloalkylthio; NR_3R_4; or phenyl, benzyl, pyridyl, furanyl, thienyl, naphthyl, pyrimidinyl, benzofuranyl, benzothienyl, or quinolinyl each optionally substituted with R_5, R_6 or R_7;

R_3 is independently hydrogen; C_1-C_4 alkyl; or phenyl optionally substituted

with at least one R_6;

R_4 is independently hydrogen; C_1-C_8 alkyl; or phenyl optionally substituted with at least one R_8;

R_5 is independently C_1-C_6 alkyl; C_1-C_6 alkoxy; C_1-C_6 haloalkyl; halogen; C_2-C_8 alkynyl; C_1-C_6 thioalkyl; phenyl or phenoxy each optionally substituted with at least one R_8; cyano; nitro; C_1-C_6 haloalkoxy; C_1-C_6 haloalkythio; C_2-C_6 alkenyl; C_2-C_6 haloalkenyl; acetyl; CO_2CH_3; or $N(C_1$-C_2 alkyl$)_2$;

R_6 is independently methyl; ethyl; methoxy; methylthio; halogen; or trifluoromethyl;

R_7 is independently halogen; and

R_8 is independently halogen; C_1-C_4 alkyl; C_1-C_4 alkoxy; C_1-C_4 haloalkyl; nitro; or cyano;

(c) n = 4 or 5, then

at least two of the amino acids are cationic amino acids;

the net charge of the peptide at neutral pH is at least +2;

R_1 is C_1-C_{20} alkyl; C_3-C_6 cycloalkyl; C_4-C_{20} alkenyl; C_4-C_{20} alkynyl; C_1-C_{20} haloalkyl; C_3-C_{20} haloalkenyl; C_3-C_{20} haloalkynyl; C_2-C_{20} alkoxyalkyl; C_2-C_{20} alkylthioalkyl; C_2-C_{20} alkylsulfinylalkyl; C_2-C_{20} alkylsulfonylalkyl; C_5-C_{20} cycloalkylalkyl; C_4-C_{20} alkenyloxyalkyl; C_4-C_{20} alkynyloxyalkyl; C_4-C_{20} (cycloalkyl) oxyalkyl; C_4-C_{20} alkenylthioalkyl; C_4-C_{20} alkynylthioalkyl; C_6-C_{20} (cycloalkyl) thioalkyl; C_2-C_{20} haloalkoxyalkyl; C_4-C_{20} haloalkenyloxyalkyl; C_4-C_{20} haloalkynyloxyalkyl; C_4-C_{20} alkoxylalkenyl; C_4-C_{20} alkoxyalkynyl; C_4-C_{20} alkylthioalkenyl; C_4-C_{20} alkylthioalkynyl; C_4-C_{20} trialkylsilylalkyl; C_1-C_{20} alkyl substituted with NR_3R_4, nitro, cyano, or phenyl optionally substituted with R_5, R_6, and R_7; C_1-C_{20} alkoxy; C_1-C_{20} haloalkoxy; C_1-C_{20} alkylthio; C_1-C_{20} haloalkylthio; NR_3R_4; or phenyl, benzyl, pyridyl, furanyl, thienyl, naphthyl, pyrimidinyl, benzofuranyl, benzothienyl, or quinolinyl each optionally substituted with R_5, R_6 or R_7;

R_3 is independently hydrogen; C_1-C_4 alkyl; or phenyl optionally substituted

with at least one R_6;

R_4 is independently hydrogen; C_1-C_8 alkyl; or phenyl optionally substituted with at least one R_8;

R_5 is independently C_1-C_6 alkyl; C_1-C_6 alkoxy; C_1-C_6 haloalkyl; halogen; C_2-C_8 alkynyl; C_1-C_6 thioalkyl; phenyl or phenoxy each optionally substituted with at least one R_8; cyano; nitro; C_1-C_6 haloalkoxy; C_1-C_6 haloalkythio; C_2-C_6 alkenyl; C_2-C_6 haloalkenyl; acetyl; CO_2CH_3; or $N(C_1$-C_2 alkyl$)_2$;

R_6 is independently methyl; ethyl; methoxy; methylthio; halogen; or trifluoromethyl;

R_7 is independently halogen; and

R_8 is independently halogen; C_1-C_4 alkyl; C_1-C_4 alkoxy; C_1-C_4 haloalkyl; nitro; or cyano.

2. The antimicrobial peptide of claim 1 wherein said peptide comprises 2 amino acids, and wherein the N-terminal amino acid is a cationic amino acid and the C-terminal amino acid is any amino acid except glutamate or aspartate.

3. The antimicrobial peptide of claim 1 wherein said peptide is selected from the group consisting of Arg-Trp; Lys-Trp; and Orn-Trp.

4. The antimicrobial peptide of claim 1 wherein said peptide is selected from the group consisting of Arg-Phe-Arg; Lys-Phe-Arg; Lys-Phe-Lys; Arg-Phe-Lys; Orn-Phe-Arg; Orn-Phe-Orn; Arg-Phe-Orn; Arg-Trp-Phe; Lys-Trp-Phe; Orn-Trp-Phe; Arg-Trp-Cys; Lys-Trp-Cys; Orn-Trp-Cys; Arg-Phe-Trp; Lys-Phe-Trp; Orn-Phe-Trp; Arg-Arg-Trp; Lys-Lys-Trp; Lys-Arg-Trp; Arg-Lys-Trp; Orn-Orn-Trp; Orn-Arg-Trp; Arg-Orn-Trp; Arg-Trp-Arg; Lys-Trp-Arg; Arg-Trp-Lys; Lys-Trp-Lys; Orn-Trp-Arg; Arg-Trp-Orn; and Orn-Trp-Orn.

5. The antimicrobial of peptide claim 1 wherein said peptide is selected from the group

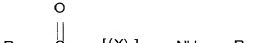
consisting of SEQ ID NO:1; SEQ ID NO:2; SEQ ID NO:3; SEQ ID NO:4; SEQ ID NO:5; SEQ ID NO:6; SEQ ID NO:7; SEQ ID NO:8; SEQ ID NO:9; SEQ ID NO:10; SEQ ID NO:11; SEQ ID NO:12; SEQ ID NO:13; SEQ ID NO:14; SEQ ID NO:15; SEQ ID NO:16; SEQ ID NO:17; SEQ ID NO:18; SEQ ID NO:19; SEQ ID NO:20; SEQ ID NO:21; SEQ ID NO:22; and SEQ ID NO:23.

6. The antimicrobial peptide of claim 1 wherein said peptide is incorporated into a polymer.

7. The antimicrobial peptide of claim 6 wherein said polymer is selected from the group consisting of a polysaccharide, a glycol polymer, a polyester, a polyurethane, a polyacrylate, a polyacrylonitrile, a polyamide, a polyolefin, a polystyrene, a vinyl polymer, a polypropylene, silk, a biopolymer, and mixtures thereof.

8. An antimicrobial peptide wherein said peptide is represented by Formula II:

Formula II



wherein:

X is any natural or non-natural, modified or unmodified amino acid except glutamate or aspartate;

n = 1 to 10;

R_1 is C_1-C_{20} alkyl; C_3-C_6 cycloalkyl; C_4-C_{20} alkenyl; C_4-C_{20} alkynyl; C_1-C_{20} haloalkyl; C_3-C_{20} haloalkenyl; C_3-C_{20} haloalkynyl; C_2-C_{20} alkoxyalkyl; C_2-C_{20} alkylthioalkyl; C_2-C_{20} alkylsulfinylalkyl; C_2-C_{20} alkylsulfonylalkyl; C_5-C_{20} cycloalkylalkyl; C_4-C_{20} alkenyloxyalkyl; C_4-C_{20} alkynyloxyalkyl; C_4-C_{20} (cycloalkyl) oxyalkyl; C_4-C_{20} alkenylthioalkyl; C_4-C_{20} alkynylthioalkyl; C_6-C_{20} (cycloalkyl) thioalkyl; C_2-C_{20} haloalkoxyalkyl; C_4-C_{20} haloalkenyloxyalkyl; C_4-C_{20} haloalkynyloxyalkyl; C_4-C_{20} alkoxylalkenyl; C_4-C_{20} alkoxyalkynyl; C_4-C_{20}

alkylthioalkenyl; C_4-C_{20} alkylthioalkynyl; C_4-C_{20} trialkylsilylalkyl; C_1-C_{20} alkyl substituted with NR_3R_4, nitro, cyano, or phenyl optionally substituted with R_5, R_6, and R_7; C_1-C_{20} alkoxy; C_1-C_{20} haloalkoxy; C_1-C_{20} alkylthio; C_1-C_{20} haloalkylthio; NR_3R_4; or phenyl, benzyl, pyridyl, furanyl, thienyl, naphthyl, pyrimidinyl, benzofuranyl, benzothienyl, or quinolinyl each optionally substituted with R_5, R_6 or R_7;

R_2 is C_1-C_{20} alkyl; C_3-C_6 cycloalkyl; C_4-C_{20} alkenyl; C_4-C_{20} alkynyl; C_1-C_{20} haloalkyl; C_3-C_{20} haloalkenyl; C_3-C_{20} haloalkynyl; C_2-C_{20} alkoxyalkyl; C_2-C_{20} alkylthioalkyl; C_2-C_{20} alkylsulfinylalkyl; C_2-C_{20} alkylsulfonylalkyl; C_5-C_{20} cycloalkylalkyl; C_4-C_{20} alkenyloxyalkyl; C_4-C_{20} alkynyloxyalkyl; C_4-C_{20} (cycloalkyl) oxyalkyl; C_4-C_{20} alkenylthioalkyl; C_4-C_{20} alkynylthioalkyl; C_6-C_{20} (cycloalkyl) thioalkyl; C_2-C_{20} haloalkoxyalkyl; C_4-C_{20} haloalkenyloxyalkyl; C_4-C_{20} haloalkynyloxyalkyl; C_4-C_{20} alkoxylalkenyl; C_4-C_{20} alkoxyalkynyl; C_4-C_{20} alkylthioalkenyl; C_4-C_{20} alkylthioalkynyl; C_4-C_{20} trialkylsilylalkyl; C_1-C_{20} alkyl substituted with NR_3R_4, nitro, cyano, or phenyl optionally substituted with R_5, R_6, and R_7; C_1-C_{20} alkoxy; C_1-C_{20} haloalkoxy; C_1-C_{20} alkylthio; C_1-C_{20} haloalkylthio; NR_3R_4; or phenyl, benzyl, pyridyl, furanyl, thienyl, naphthyl, pyrimidinyl, benzofuranyl, benzothienyl, or quinolinyl each optionally substituted with R_5, R_6 or R_7;

R_3 is independently hydrogen; C_1-C_4 alkyl; or phenyl optionally substituted with at least one R_8;

R_4 is independently hydrogen; C_1-C_8 alkyl; or phenyl optionally substituted with at least one R_8;

R_5 is independently C_1-C_6 alkyl; C_1-C_6 alkoxy; C_1-C_6 haloalkyl; halogen; C_2-C_8 alkynyl; C_1-C_6 thioalkyl; phenyl or phenoxy each optionally substituted with at least one R_8; cyano; nitro; C_1-C_6 haloalkoxy; C_1-C_6 haloalkythio; C_2-C_6 alkenyl; C_2-C_6 haloalkenyl; acetyl; CO_2CH_3; or $N(C_1$-C_2 alkyl$)_2$;

R_6 is independently methyl; ethyl; methoxy; methylthio; halogen; or trifluoromethyl;

R_7 is independently halogen; and

R_8 is independently halogen; C_1-C_4 alkyl; C_1-C_4 alkoxy; C_1-C_4 haloalkyl; nitro; or cyano.

9. The antimicrobial peptide of claim 8 wherein:

(a) when n = 1, 2 or 3, then

at least one amino acid is a cationic amino acid, and

the net charge of said peptide at neutral pH is at least +1;

(b) when n = 4, then

at least two of the amino acids are cationic amino acids, and

the net charge of said peptide at neutral pH is at least +2;

(c) when n = 5, 6 or 7, then

at least three of the amino acids are cationic amino acids, and

the net charge of the peptide at neutral pH is at least +3; and

(d) when n = 8, 9, or 10, then

at least four of the amino acids are cationic amino acids, and

the net charge of the peptide at neutral pH is at least +4.

10. The antimicrobial peptide of claim 8 wherein said peptide is selected from the group consisting of arginine, lysine and ornithine.

11. The antimicrobial peptide of claim 8 wherein said peptide comprises 2 amino acids wherein at least one of the amino acids is a cationic amino acid, wherein the net charge of said peptide is at least +1.

12. The antimicrobial peptide of claim 11 wherein said peptide is selected from the group consisting of Arg-Arg; Arg-Phe; Arg-Tyr; Arg-Ala; Arg-Ile; Arg-Leu; Arg-Pro; Arg-Val; Arg-Cys; Arg-Met; Arg-Ser; Arg-Thr; Arg-Asn; Arg-Gln; Arg-Nal; Arg-His; Arg-Gly; Phe-Arg; Tyr-Arg; Ala-Arg; Ile-Arg; Leu-Arg; Pro-Arg; Val-Arg; Cys-Arg; Met-

Arg; Ser-Arg; Thr-Arg; Asn-Arg; Gln-Arg; Nal-Arg; His-Arg; and Gly-Arg.

13. The antimicrobial peptide of claim 8 wherein said peptide is selected from the group consisting of Arg-Arg-Arg; Arg-Phe-Arg; Arg-Tyr-Arg; Arg-Ala-Arg; Arg-Ile-Arg; Arg-Leu-Arg; Arg-Pro-Arg; Arg-Val-Arg; Arg-Cys-Arg; Arg-Met-Arg; Arg-Ser-Arg; Arg-Thr-Arg; Arg-Asn-Arg; Arg-Gln-Arg; Arg-Nal-Arg; Arg-Orn-Arg; Arg-His-Arg; Arg-Lys-Arg; Arg-Gly-Arg; Arg-Arg-Nal; Arg-Arg-Phe; Arg-Arg-Tyr; Arg-Arg-Ala; Arg-Arg-Ile; Arg-Arg-Leu; Arg-Arg-Pro; Arg-Arg-Val; Arg-Arg-Cys; Arg-Arg-Met; Arg-Arg-Ser; Arg-Arg-Thr; Arg-Arg-Asn; Arg-Arg-Gln; Arg-Arg-Lys; Arg-Arg-His; Arg-Arg-Orn; and Arg-Arg-Gly.

14. The antimicrobial peptide peptide of claim 8 wherein said peptide is incorporated into a polymer.

15. The antimicrobial peptide of claim 14 wherein said polymer is selected from the group consisting of a polysaccharide, a glycol polymer, a polyester, a polyurethane, a polyacrylate, a polyacrylonitrile, a polyamide, a polyolefin, a polystyrene, a vinyl polymer, a polypropylene, silk, a biopolymer, and mixtures thereof.

16. An antimicrobial composition comprising at least one antimicrobial peptide and at least one carrier wherein said antimicrobial peptide is represented by Formula I:

Formula I

wherein:

X is any natural or non-natural, modified or unmodified amino acid except glutamate or aspartate;

n = 1 to 5;

wherein:

(a) when n = 1, then

said peptide comprises a cationic amino acid;

the charge of said peptide at neutral pH is at least 1;

R_1 is C_1-C_{20} alkyl; C_3-C_6 cycloalkyl; C_4-C_{20} alkenyl; C_4-C_{20} alkynyl; C_1-C_{20} haloalkyl; C_3-C_{20} haloalkenyl; C_3-C_{20} haloalkynyl; C_2-C_{20} alkoxyalkyl; C_2-C_{20} alkylthioalkyl; C_2-C_{20} alkylsulfinylalkyl; C_2-C_{20} alkylsulfonylalkyl; C_5-C_{20} cycloalkylalkyl; C_4-C_{20} alkenyloxyalkyl; C_4-C_{20} alkynyloxyalkyl; C_4-C_{20} (cycloalkyl) oxyalkyl; C_4-C_{20} alkenylthioalkyl; C_4-C_{20} alkynylthioalkyl; C_6-C_{20} (cycloalkyl) thioalkyl; C_2-C_{20} haloalkoxyalkyl; C_4-C_{20} haloalkenyloxyalkyl; C_4-C_{20} haloalkynyloxyalkyl; C_4-C_{20} alkoxylalkenyl; C_4-C_{20} alkoxyalkynyl; C_4-C_{20} alkylthioalkenyl; C_4-C_{20} alkylthioalkynyl; C_4-C_{20} trialkylsilylalkyl; C_1-C_{20} alkyl substituted with NR_3R_4, nitro, cyano, or phenyl optionally substituted with R_5, R_6, and R_7; C_1-C_{20} alkoxy; C_1-C_{20} haloalkoxy; C_1-C_{20} alkylthio; C_1-C_{20} haloalkylthio; NR_3R_4; or phenyl, benzyl, pyridyl, furanyl, thienyl, naphthyl, pyrimidinyl, benzofuranyl, benzothienyl, or quinolinyl each optionally substituted with R_5, R_6 or R_7;

R_3 is independently hydrogen; C_1-C_4 alkyl; or phenyl optionally substituted with at least one R_8;

R_4 is independently hydrogen; C_1-C_8 alkyl; or phenyl optionally substituted with at least one R_8;

R_5 is independently C_1-C_6 alkyl; C_1-C_6 alkoxy; C_1-C_6 haloalkyl; halogen; C_2-C_8 alkynyl; C_1-C_6 thioalkyl; phenyl or phenoxy each optionally substituted with at least one R_8; cyano; nitro; C_1-C_6 haloalkoxy; C_1-C_6 haloalkythio; C_2-C_6 alkenyl; C_2-C_6 haloalkenyl; acetyl; CO_2CH_3; or $N(C_1$-C_2 alkyl$)_2$;

R_6 is independently methyl; ethyl; methoxy; methylthio; halogen; or trifluoromethyl;

R_7 is independently halogen; and

R_8 is independently halogen; C_1-C_4 alkyl; C_1-C_4 alkoxy; C_1-C_4 haloalkyl; nitro; or cyano;

(b) when n = 2 or 3, then

at least one of the amino acids is a cationic amino acid;

the net charge of said peptide at neutral pH is at least +1;

R_1 is C_1-C_9 alkyl; C_3-C_6 cycloalkyl; C_4-C_9 alkenyl; C_4-C_9 alkynyl; C_1-C_9 haloalkyl; C_3-C_9 haloalkenyl; C_3-C_9 haloalkynyl; C_2-C_9 alkoxyalkyl; C_2-C_9 alkylthioalkyl; C_2-C_9 alkylsulfinylalkyl; C_2-C_9 alkylsulfonylalkyl; C_5-C_9 cycloalkylalkyl; C_4-C_9 alkenyloxyalkyl; C_4-C_9 alkynyloxyalkyl; C_4-C_9 (cycloalkyl) oxyalkyl; C_4-C_9 alkenylthioalkyl; C_4-C_9 alkynylthioalkyl; C_6-C_9 (cycloalkyl) thioalkyl; C_2-C_9 haloalkoxyalkyl; C_4-C_9 haloalkenyloxyalkyl; C_4-C_9 haloalkynyloxyalkyl; C_4-C_9 alkoxylalkenyl; C_4-C_9 alkoxyalkynyl; C_4-C_9 alkylthioalkenyl; C_4-C_9 alkylthioalkynyl; C_4-C_9 trialkylsilylalkyl; C_1-C_9 alkyl substituted with NR_3R_4, nitro, cyano, or phenyl optionally substituted with R_5, R_6, and R_7; C_1-C_9 alkoxy; C_1-C_9 haloalkoxy; C_1-C_9 alkylthio; C_1-C_9 haloalkylthio; NR_3R_4; or phenyl, benzyl, pyridyl, furanyl, thienyl, naphthyl, pyrimidinyl, benzofuranyl, benzothienyl, or quinolinyl each optionally substituted with R_5, R_6 or R_7;

R_3 is independently hydrogen; C_1-C_4 alkyl; or phenyl optionally substituted with at least one R_8;

R_4 is independently hydrogen; C_1-C_8 alkyl; or phenyl optionally substituted with at least one R_8;

R_5 is independently C_1-C_6 alkyl; C_1-C_6 alkoxy; C_1-C_6 haloalkyl; halogen; C_2-C_8 alkynyl; C_1-C_6 thioalkyl; phenyl or phenoxy each optionally substituted with at least one R_8; cyano; nitro; C_1-C_6 haloalkoxy; C_1-C_6 haloalkythio; C_2-C_6 alkenyl; C_2-C_6 haloalkenyl; acetyl; CO_2CH_3; or $N(C_1$-C_2 alkyl$)_2$;

R_6 is independently methyl; ethyl; methoxy; methylthio; halogen; or trifluoromethyl;

R_7 is independently halogen; and

R_8 is independently halogen; C_1-C_4 alkyl; C_1-C_4 alkoxy; C_1-C_4 haloalkyl; nitro; or cyano;

(c) when n = 4 or 5, then

at least two of the amino acids are cationic amino acids;

the net charge of the peptide at neutral pH is at least +2;

R_1 is C_1-C_{20} alkyl; C_3-C_6 cycloalkyl; C_4-C_{20} alkenyl; C_4-C_{20} alkynyl; C_1-C_{20} haloalkyl; C_3-C_{20} haloalkenyl; C_3-C_{20} haloalkynyl; C_2-C_{20} alkoxyalkyl; C_2-C_{20} alkylthioalkyl; C_2-C_{20} alkylsulfinylalkyl; C_2-C_{20} alkylsulfonylalkyl; C_5-C_{20} cycloalkylalkyl; C_4-C_{20} alkenyloxyalkyl; C_4-C_{20} alkynyloxyalkyl; C_4-C_{20} (cycloalkyl) oxyalkyl; C_4-C_{20} alkenylthioalkyl; C_4-C_{20} alkynylthioalkyl; C_6-C_{20} (cycloalkyl) thioalkyl; C_2-C_{20} haloalkoxyalkyl; C_4-C_{20} haloalkenyloxyalkyl; C_4-C_{20} haloalkynyloxyalkyl; C_4-C_{20} alkoxylalkenyl; C_4-C_{20} alkoxyalkynyl; C_4-C_{20} alkylthioalkenyl; C_4-C_{20} alkylthioalkynyl; C_4-C_{20} trialkylsilylalkyl; C_1-C_{20} alkyl substituted with NR_3R_4, nitro, cyano, or phenyl optionally substituted with R_5, R_6, and R_7; C_1-C_{20} alkoxy; C_1-C_{20} haloalkoxy; C_1-C_{20} alkylthio; C_1-C_{20} haloalkylthio; NR_3R_4; or phenyl, benzyl, pyridyl, furanyl, thienyl, naphthyl, pyrimidinyl, benzofuranyl, benzothienyl, or quinolinyl each optionally substituted with R_5, R_6 or R_7;

R_3 is independently hydrogen; C_1-C_4 alkyl; or phenyl optionally substituted with at least one R_8;

R_4 is independently hydrogen; C_1-C_8 alkyl; or phenyl optionally substituted with at least one R_8;

R_5 is independently C_1-C_6 alkyl; C_1-C_6 alkoxy; C_1-C_6 haloalkyl; halogen; C_2-C_8 alkynyl; C_1-C_6 thioalkyl; phenyl or phenoxy each optionally substituted with at least one R_8; cyano; nitro; C_1-C_6 haloalkoxy; C_1-C_6 haloalkythio; C_2-C_6 alkenyl; C_2-C_6 haloalkenyl; acetyl; CO_2CH_3; or $N(C_1$-C_2 alkyl$)_2$;

R_6 is independently methyl; ethyl; methoxy; methylthio; halogen; or trifluoromethyl;

R_7 is independently halogen; and

R_8 is independently halogen; C_1-C_4 alkyl; C_1-C_4 alkoxy; C_1-C_4 haloalkyl; nitro; or cyano.

17. The antimicrobial composition of claim 16 wherein said peptide comprises 2 amino acids, and wherein the N-terminal amino acid is a cationic amino acid.

18. The antimicrobial composition of claim 17 wherein said peptide is selected from the group consisting of Arg-Trp; Lys-Trp; and Orn-Trp.

19. The antimicrobial composition of claim 16 wherein said peptide is selected from the group consisting of Arg-Phe-Arg; Lys-Phe-Arg; Lys-Phe-Lys; Arg-Phe-Lys; Orn-Phe-Arg; Orn-Phe-Orn; Arg-Phe-Orn; Arg-Trp-Phe; Lys-Trp-Phe; Orn-Trp-Phe; Arg-Trp-Cys; Lys-Trp-Cys; Orn-Trp-Cys; Arg-Phe-Trp; Lys-Phe-Trp; Orn-Phe-Trp; Arg-Arg-Trp; Lys-Lys-Trp; Lys-Arg-Trp; Arg-Lys-Trp; Orn-Orn-Trp; Orn-Arg-Trp; Arg-Orn-Trp; Arg-Trp-Arg; Lys-Trp-Arg; Arg-Trp-Lys; Lys-Trp-Lys; Orn-Trp-Arg; Arg-Trp-Orn; and Orn-Trp-Orn.

20. The antimicrobial composition of claim 16 wherein said peptide is selected from the group consisting of SEQ ID NO:1; SEQ ID NO:2; SEQ ID NO:3; SEQ ID NO:4; SEQ ID NO:5; SEQ ID NO:6; SEQ ID NO:7; SEQ ID NO:8; SEQ ID NO:9; SEQ ID NO:10; SEQ ID NO:11; SEQ ID NO:12; SEQ ID NO:13; SEQ ID NO:14; SEQ ID NO:15; SEQ ID NO:16; SEQ ID NO:17; SEQ ID NO:18; SEQ ID NO:19; SEQ ID NO:20; SEQ ID NO:21; SEQ ID NO:22; and SEQ ID NO:23.

21. An antimicrobial composition comprising at least one antimicrobial peptide and at least one carrier wherein said antimicrobial peptide is represented by Formula II:

Formula II

wherein:

X is any natural or non-natural, modified or unmodified amino acid except

glutamate or aspartate;

n = 1 to 10;

R_1 is C_1-C_{20} alkyl; C_3-C_6 cycloalkyl; C_4-C_{20} alkenyl; C_4-C_{20} alkynyl; C_1-C_{20} haloalkyl; C_3-C_{20} haloalkenyl; C_3-C_{20} haloalkynyl; C_2-C_{20} alkoxyalkyl; C_2-C_{20} alkylthioalkyl; C_2-C_{20} alkylsulfinylalkyl; C_2-C_{20} alkylsulfonylalkyl; C_5-C_{20} cycloalkylalkyl; C_4-C_{20} alkenyloxyalkyl; C_4-C_{20} alkynyloxyalkyl; C_4-C_{20} (cycloalkyl) oxyalkyl; C_4-C_{20} alkenylthioalkyl; C_4-C_{20} alkynylthioalkyl; C_6-C_{20} (cycloalkyl) thioalkyl; C_2-C_{20} haloalkoxyalkyl; C_4-C_{20} haloalkenyloxyalkyl; C_4-C_{20} haloalkynyloxyalkyl; C_4-C_{20} alkoxylalkenyl; C_4-C_{20} alkoxyalkynyl; C_4-C_{20} alkylthioalkenyl; C_4-C_{20} alkylthioalkynyl; C_4-C_{20} trialkylsilylalkyl; C_1-C_{20} alkyl substituted with NR_3R_4, nitro, cyano, or phenyl optionally substituted with R_5, R_6, and R_7; C_1-C_{20} alkoxy; C_1-C_{20} haloalkoxy; C_1-C_{20} alkylthio; C_1-C_{20} haloalkylthio; NR_3R_4; or phenyl, benzyl, pyridyl, furanyl, thienyl, naphthyl, pyrimidinyl, benzofuranyl, benzothienyl, or quinolinyl each optionally substituted with R_5, R_6 or R_7;

R_2 is C_1-C_{20} alkyl; C_3-C_6 cycloalkyl; C_4-C_{20} alkenyl; C_4-C_{20} alkynyl; C_1-C_{20} haloalkyl; C_3-C_{20} haloalkenyl; C_3-C_{20} haloalkynyl; C_2-C_{20} alkoxyalkyl; C_2-C_{20} alkylthioalkyl; C_2-C_{20} alkylsulfinylalkyl; C_2-C_{20} alkylsulfonylalkyl; C_5-C_{20} cycloalkylalkyl; C_4-C_{20} alkenyloxyalkyl; C_4-C_{20} alkynyloxyalkyl; C_4-C_{20} (cycloalkyl) oxyalkyl; C_4-C_{20} alkenylthioalkyl; C_4-C_{20} alkynylthioalkyl; C_6-C_{20} (cycloalkyl) thioalkyl; C_2-C_{20} haloalkoxyalkyl; C_4-C_{20} haloalkenyloxyalkyl; C_4-C_{20} haloalkynyloxyalkyl; C_4-C_{20} alkoxylalkenyl; C_4-C_{20} alkoxyalkynyl; C_4-C_{20} alkylthioalkenyl; C_4-C_{20} alkylthioalkynyl; C_4-C_{20} trialkylsilylalkyl; C_1-C_{20} alkyl substituted with NR_3R_4, nitro, cyano, or phenyl optionally substituted with R_5, R_6, and R_7; C_1-C_{20} alkoxy; C_1-C_{20} haloalkoxy; C_1-C_{20} alkylthio; C_1-C_{20} haloalkylthio; NR_3R_4; or phenyl, benzyl, pyridyl, furanyl, thienyl, naphthyl, pyrimidinyl, benzofuranyl, benzothienyl, or quinolinyl each optionally substituted with R_5, R_6 or R_7;

R_3 is independently hydrogen; C_1-C_4 alkyl; or phenyl optionally substituted

with at least one R_8;

R_4 is independently hydrogen; C_1-C_8 alkyl; or phenyl optionally substituted with at least one R_8;

R_5 is independently C_1-C_6 alkyl; C_1-C_6 alkoxy; C_1-C_6 haloalkyl; halogen; C_2-C_8 alkynyl; C_1-C_6 thioalkyl; phenyl or phenoxy each optionally substituted with at least one R_8; cyano; nitro; C_1-C_6 haloalkoxy; C_1-C_6 haloalkythio; C_2-C_6 alkenyl; C_2-C_6 haloalkenyl; acetyl; CO_2CH_3; or $N(C_1$-C_2 alkyl$)_2$;

R_6 is independently methyl; ethyl; methoxy; methylthio; halogen; or trifluoromethyl;

R_7 is independently halogen; and

R_8 is independently halogen; C_1-C_4 alkyl; C_1-C_4 alkoxy; C_1-C_4 haloalkyl; nitro; or cyano.

22. The antimicrobial composition of claim 21 wherein wherein:

(a) when n = 1, 2 or 3, then at least one amino acid is a cationic amino acid, and the net charge of said peptide at neutral pH is at least +1;

(b) when n = 4, then
at least two of the amino acids are cationic amino acids, and
the net charge of said peptide at neutral pH is at least +2;

(c) when n = 5, 6, or 7, then
at least three of the amino acids are cationic amino acids, and
the net charge of the peptide at neutral pH is at least +3; and

(d) when n = 8, 9, or 10, then
at least four of the amino acids are cationic amino acids, and
the net charge of the peptide at neutral pH is at least +4.

23. The antimicrobial composition of claim 21 wherein said peptide is selected from the group consisting of arginine, lysine and ornithine.

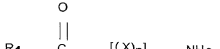
24. The antimicrobial composition of claim 21 wherein said peptide comprises 2 amino acids wherein at least one of the amino acids is a cationic amino acid and wherein the net charge of said peptide is at least +1.

25. The antimicrobial composition of claim 24 wherein said peptide is selected from the group consisting of Arg-Arg; Arg-Phe; Arg-Tyr; Arg-Ala; Arg-Ile; Arg-Leu; Arg-Pro; Arg-Val; Arg-Cys; Arg-Met; Arg-Ser; Arg-Thr; Arg-Asn; Arg-Gln; Arg-Nal; Arg-His; Arg-Gly; Phe-Arg; Tyr-Arg; Ala-Arg; Ile-Arg; Leu-Arg; Pro-Arg; Val-Arg; Cys-Arg; Met-Arg; Ser-Arg; Thr-Arg; Asn-Arg; Gln-Arg; Nal-Arg; His-Arg; and Gly-Arg.

26. The antimicrobial composition of claim 21 wherein said peptide is selected from the group consisting of Arg-Arg-Arg; Arg-Phe-Arg; Arg-Tyr-Arg; Arg-Ala-Arg; Arg-Ile-Arg; Arg-Leu-Arg; Arg-Pro-Arg; Arg-Val-Arg; Arg-Cys-Arg; Arg-Met-Arg; Arg-Ser-Arg; Arg-Thr-Arg; Arg-Asn-Arg; Arg-Gln-Arg; Arg-Nal-Arg; Arg-Orn-Arg; Arg-His-Arg; Arg-Lys-Arg; Arg-Gly-Arg; Arg-Arg-Nal; Arg-Arg-Phe; Arg-Arg-Tyr; Arg-Arg-Ala; Arg-Arg-Ile; Arg-Arg-Leu; Arg-Arg-Pro; Arg-Arg-Val; Arg-Arg-Cys; Arg-Arg-Met; Arg-Arg-Ser; Arg-Arg-Thr; Arg-Arg-Asn; Arg-Arg-Gln; Arg-Arg-Lys; Arg-Arg-His; Arg-Arg-Orn; and Arg-Arg-Gly.

27. A method of preventing, inhibiting, or terminating the growth of at least one microbe comprising administering an antimicrobial amount of an antimicrobial comprising at least one antimicrobial peptide wherein said antimicrobial peptide is represented by Formula I:

Formula I



wherein:

X is any natural or non-natural, modified or unmodified amino acid except

glutamate or aspartate;

n = 1 to 5;

wherein:

(a) when n = 1, then

said peptide comprises a cationic amino acid;

the charge of said peptide at neutral pH is at least 1;

R_1 is C_1-C_{20} alkyl; C_3-C_6 cycloalkyl; C_4-C_{20} alkenyl; C_4-C_{20} alkynyl; C_1-C_{20} haloalkyl; C_3-C_{20} haloalkenyl; C_3-C_{20} haloalkynyl; C_2-C_{20} alkoxyalkyl; C_2-C_{20} alkylthioalkyl; C_2-C_{20} alkylsulfinylalkyl; C_2-C_{20} alkylsulfonylalkyl; C_5-C_{20} cycloalkylalkyl; C_4-C_{20} alkenyloxyalkyl; C_4-C_{20} alkynyloxyalkyl; C_4-C_{20} (cycloalkyl) oxyalkyl; C_4-C_{20} alkenylthioalkyl; C_4-C_{20} alkynylthioalkyl; C_6-C_{20} (cycloalkyl) thioalkyl; C_2-C_{20} haloalkoxyalkyl; C_4-C_{20} haloalkenyloxyalkyl; C_4-C_{20} haloalkynyloxyalkyl; C_4-C_{20} alkoxylalkenyl; C_4-C_{20} alkoxyalkynyl; C_4-C_{20} alkylthioalkenyl; C_4-C_{20} alkylthioalkynyl; C_4-C_{20} trialkylsilylalkyl; C_1-C_{20} alkyl substituted with NR_3R_4, nitro, cyano, or phenyl optionally substituted with R_5, R_6, and R_7; C_1-C_{20} alkoxy; C_1-C_{20} haloalkoxy; C_1-C_{20} alkylthio; C_1-C_{20} haloalkylthio; NR_3R_4; or phenyl, benzyl, pyridyl, furanyl, thienyl, naphthyl, pyrimidinyl, benzofuranyl, benzothienyl, or quinolinyl each optionally substituted with R_5, R_6 or R_7;

R_3 is independently hydrogen; C_1-C_4 alkyl; or phenyl optionally substituted with at least one R_8;

R_4 is independently hydrogen; C_1-C_8 alkyl; or phenyl optionally substituted with at least one R_8;

R_5 is independently C_1-C_6 alkyl; C_1-C_6 alkoxy; C_1-C_6 haloalkyl; halogen; C_2-C_8 alkynyl; C_1-C_6 thioalkyl; phenyl or phenoxy each optionally substituted with at least one R_8; cyano; nitro; C_1-C_6 haloalkoxy; C_1-C_6 haloalkythio; C_2-C_6 alkenyl; C_2-C_6 haloalkenyl; acetyl; CO_2CH_3; or $N(C_1$-C_2 alkyl$)_2$;

R_6 is independently methyl; ethyl; methoxy; methylthio; halogen; or trifluoromethyl;

R_7 is independently halogen; and

R_8 is independently halogen; C_1-C_4 alkyl; C_1-C_4 alkoxy; C_1-C_4 haloalkyl; nitro; or cyano;

(b) when n = 2 or 3, then

at least one of the amino acids is a cationic amino acid;

the net charge of said peptide at neutral pH is at least +1;

R_1 is C_1-C_9 alkyl; C_3-C_6 cycloalkyl; C_4-C_9 alkenyl; C_4-C_9 alkynyl; C_1-C_9 haloalkyl; C_3-C_9 haloalkenyl; C_3-C_9 haloalkynyl; C_2-C_9 alkoxyalkyl; C_2-C_9 alkylthioalkyl; C_2-C_9 alkylsulfinylalkyl; C_2-C_9 alkylsulfonylalkyl; C_5-C_9 cycloalkylalkyl; C_4-C_9 alkenyloxyalkyl; C_4-C_9 alkynyloxyalkyl; C_4-C_9 (cycloalkyl) oxyalkyl; C_4-C_9 alkenylthioalkyl; C_4-C_9 alkynylthioalkyl; C_6-C_9 (cycloalkyl) thioalkyl; C_2-C_9 haloalkoxyalkyl; C_4-C_9 haloalkenyloxyalkyl; C_4-C_9 haloalkynyloxyalkyl; C_4-C_9 alkoxylalkenyl; C_4-C_9 alkoxyalkynyl; C_4-C_9 alkylthioalkenyl; C_4-C_9 alkylthioalkynyl; C_4-C_9 trialkylsilylalkyl; C_1-C_9 alkyl substituted with NR_3R_4, nitro, cyano, or phenyl optionally substituted with R_5, R_6, and R_7; C_1-C_9 alkoxy; C_1-C_9 haloalkoxy; C_1-C_9 alkylthio; C_1-C_9 haloalkylthio; NR_3R_4; or phenyl, benzyl, pyridyl, furanyl, thienyl, naphthyl, pyrimidinyl, benzofuranyl, benzothienyl, or quinolinyl each optionally substituted with R_5, R_6 or R_7;

R_3 is independently hydrogen; C_1-C_4 alkyl; or phenyl optionally substituted with at least one R_8;

R_4 is independently hydrogen; C_1-C_8 alkyl; or phenyl optionally substituted with at least one R_8;

R_5 is independently C_1-C_6 alkyl; C_1-C_6 alkoxy; C_1-C_6 haloalkyl; halogen; C_2-C_8 alkynyl; C_1-C_6 thioalkyl; phenyl or phenoxy each optionally substituted with at least one R_8; cyano; nitro; C_1-C_6 haloalkoxy; C_1-C_6 haloalkythio; C_2-C_6 alkenyl; C_2-C_6 haloalkenyl; acetyl; CO_2CH_3; or $N(C_1$-C_2 alkyl$)_2$;

R_6 is independently methyl; ethyl; methoxy; methylthio; halogen; or trifluoromethyl;

R_7 is independently halogen; and

R_8 is independently halogen; C_1-C_4 alkyl; C_1-C_4 alkoxy; C_1-C_4 haloalkyl; nitro; or cyano;

(c) when n = 4 or 5, then

at least two of the amino acids are cationic amino acids;

the net charge of the peptide at neutral pH is at least +2;

R_1 is C_1-C_{20} alkyl; C_3-C_6 cycloalkyl; C_4-C_{20} alkenyl; C_4-C_{20} alkynyl; C_1-C_{20} haloalkyl; C_3-C_{20} haloalkenyl; C_3-C_{20} haloalkynyl; C_2-C_{20} alkoxyalkyl; C_2-C_{20} alkylthioalkyl; C_2-C_{20} alkylsulfinylalkyl; C_2-C_{20} alkylsulfonylalkyl; C_5-C_{20} cycloalkylalkyl; C_4-C_{20} alkenyloxyalkyl; C_4-C_{20} alkynyloxyalkyl; C_4-C_{20} (cycloalkyl) oxyalkyl; C_4-C_{20} alkenylthioalkyl; C_4-C_{20} alkynylthioalkyl; C_6-C_{20} (cycloalkyl) thioalkyl; C_2-C_{20} haloalkoxyalkyl; C_4-C_{20} haloalkenyloxyalkyl; C_4-C_{20} haloalkynyloxyalkyl; C_4-C_{20} alkoxylalkenyl; C_4-C_{20} alkoxyalkynyl; C_4-C_{20} alkylthioalkenyl; C_4-C_{20} alkylthioalkynyl; C_4-C_{20} trialkylsilylalkyl; C_1-C_{20} alkyl substituted with NR_3R_4, nitro, cyano, or phenyl optionally substituted with R_5, R_6, and R_7; C_1-C_{20} alkoxy; C_1-C_{20} haloalkoxy; C_1-C_{20} alkylthio; C_1-C_{20} haloalkylthio; NR_3R_4; or phenyl, benzyl, pyridyl, furanyl, thienyl, naphthyl, pyrimidinyl, benzofuranyl, benzothienyl, or quinolinyl each optionally substituted with R_5, R_6 or R_7;

R_3 is independently hydrogen; C_1-C_4 alkyl; or phenyl optionally substituted with at least one R_8;

R_4 is independently hydrogen; C_1-C_8 alkyl; or phenyl optionally substituted with at least one R_8;

R_5 is independently C_1-C_6 alkyl; C_1-C_6 alkoxy; C_1-C_6 haloalkyl; halogen; C_2-C_8 alkynyl; C_1-C_6 thioalkyl; phenyl or phenoxy each optionally substituted with at least one R_8; cyano; nitro; C_1-C_6 haloalkoxy; C_1-C_6 haloalkythio; C_2-C_6 alkenyl; C_2-C_6 haloalkenyl; acetyl; CO_2CH_3; or $N(C_1$-C_2 alkyl$)_2$;

R_6 is independently methyl; ethyl; methoxy; methylthio; halogen; or trifluoromethyl;

R_7 is independently halogen; and

R_8 is independently halogen; C_1-C_4 alkyl; C_1-C_4 alkoxy; C_1-C_4 haloalkyl; nitro; or cyano.

28. A method of preventing, inhibiting, or terminating the growth of at least one microbe comprising administering an antimicrobial amount of an antimicrobial comprising at least one antimicrobial peptide wherein said antimicrobial peptide is represented by Formula II:

Formula II 

wherein:

X is any natural or non-natural, modified or unmodified amino acid except glutamate or aspartate;

n = 1 to 10;

R_1 is C_1-C_{20} alkyl; C_3-C_6 cycloalkyl; C_4-C_{20} alkenyl; C_4-C_{20} alkynyl; C_1-C_{20} haloalkyl; C_3-C_{20} haloalkenyl; C_5-C_{20} haloalkynyl; C_2-C_{20} alkoxyalkyl; C_2-C_{20} alkylthioalkyl; C_2-C_{20} alkylsulfinylalkyl; C_2-C_{20} alkylsulfonylalkyl; C_5-C_{20} cycloalkylalkyl; C_4-C_{20} alkenyloxyalkyl; C_4-C_{20} alkynyloxyalkyl; C_4-C_{20} (cycloalkyl) oxyalkyl; C_4-C_{20} alkenylthioalkyl; C_4-C_{20} alkynylthioalkyl; C_6-C_{20} (cycloalkyl) thioalkyl; C_2-C_{20} haloalkoxyalkyl; C_4-C_{20} haloalkenyloxyalkyl; C_4-C_{20} haloalkynyloxyalkyl; C_4-C_{20} alkoxyalkenyl; C_4-C_{20} alkoxyalkynyl; C_4-C_{20} alkylthioalkenyl; C_4-C_{20} alkylthioalkynyl; C_4-C_{20} trialkylsilylalkyl; C_1-C_{20} alkyl substituted with NR_3R_4, nitro, cyano, or phenyl optionally substituted with R_5, R_6, and R_7; C_1-C_{20} alkoxy; C_1-C_{20} haloalkoxy; C_1-C_{20} alkylthio; C_1-C_{20} haloalkylthio; NR_3R_4; or phenyl, benzyl, pyridyl, furanyl, thienyl, naphthyl, pyrimidinyl, benzofuranyl, benzothienyl, or quinolinyl each optionally substituted with R_5, R_6 or R_7;

R_2 is C_1-C_{20} alkyl; C_3-C_6 cycloalkyl; C_4-C_{20} alkenyl; C_4-C_{20} alkynyl; C_1-C_{20} haloalkyl; C_3-C_{20} haloalkenyl; C_3-C_{20} haloalkynyl; C_2-C_{20} alkoxyalkyl; C_2-C_{20} alkylthioalkyl; C_2-C_{20} alkylsulfinylalkyl; C_2-C_{20} alkylsulfonylalkyl; C_5-C_{20} cycloalkylalkyl; C_4-C_{20} alkenyloxyalkyl; C_4-C_{20} alkynyloxyalkyl; C_4-C_{20} (cycloalkyl) oxyalkyl; C_4-C_{20} alkenylthioalkyl; C_4-C_{20} alkynylthioalkyl; C_6-C_{20} (cycloalkyl) thioalkyl; C_2-C_{20} haloalkoxyalkyl; C_4-C_{20} haloalkenyloxyalkyl; C_4-C_{20} haloalkynyloxyalkyl; C_4-C_{20} alkoxylalkenyl; C_4-C_{20} alkoxyalkynyl; C_4-C_{20} alkylthioalkenyl; C_4-C_{20} alkylthioalkynyl; C_4-C_{20} trialkylsilylalkyl; C_1-C_{20} alkyl substituted with NR_3R_4, nitro, cyano, or phenyl optionally substituted with R_5, R_6, and R_7; C_1-C_{20} alkoxy; C_1-C_{20} haloalkoxy; C_1-C_{20} alkylthio; C_1-C_{20} haloalkylthio; NR_3R_4; or phenyl, benzyl, pyridyl, furanyl, thienyl, naphthyl, pyrimidinyl, benzofuranyl, benzothienyl, or quinolinyl each optionally substituted with R_5, R_6 or R_7;

R_3 is independently hydrogen; C_1-C_4 alkyl; or phenyl optionally substituted with at least one R_8;

R_4 is independently hydrogen; C_1-C_8 alkyl; or phenyl optionally substituted with at least one R_8;

R_5 is independently C_1-C_6 alkyl; C_1-C_6 alkoxy; C_1-C_6 haloalkyl; halogen; C_2-C_8 alkynyl; C_1-C_6 thioalkyl; phenyl or phenoxy each optionally substituted with at least one R_8; cyano; nitro; C_1-C_6 haloalkoxy; C_1-C_6 haloalkythio; C_2-C_6 alkenyl; C_2-C_6 haloalkenyl; acetyl; CO_2CH_3; or $N(C_1$-C_2 alkyl$)_2$;

R_6 is independently methyl; ethyl; methoxy; methylthio; halogen; or trifluoromethyl;

R_7 is independently halogen; and

R_8 is independently halogen; C_1-C_4 alkyl; C_1-C_4 alkoxy; C_1-C_4 haloalkyl; nitro; or cyano.

29. The method of claim 28 wherein wherein:

(a) when n = 1, 2 or 3, then

at least one amino acid is a cationic amino acid, and

the net charge of said peptide at neutral pH is at least +1;

(b) when n = 4, then

at least two of the amino acids are cationic amino acids, and

the net charge of said peptide at neutral pH is at least +2;

(c) when n = 5, 6, or 7, then

at least three of the amino acids are cationic amino acids, and

the net charge of the peptide at neutral pH is at least +3; and

(d) when n = 8, 9, or 10, then

at least four of the amino acids are cationic amino acids, and

the net charge of the peptide at neutral pH is at least +4.

30. A substrate coated with the antimicrobial of claim 16.

31. A substrate coated with the antimicrobial of claim 21.